Shubham Ugare

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Education

University of Illinois at Urbana-Champaign [*PhD*]   *2020 - 2025*
Computer Science (Adviser: Prof. Sasa Misailovic, Prof. Gagandeep Singh)

    Research areas: Machine Learning, Programming Languages

Indian Institute of Technology, Guwahati [*BTech*]   *2014 - 2018*
Computer Science and minor in Mathematics

Work Experience

- **Meta** [*Research Scientist*]   *July 25 - Present*
  - Improving LLMs for code generation and building coding LLM agents

- **Bloomberg LP** [*Part-time Researcher*]   *May 24 - May 25*
  - *Large language models* for generating program specifications

- **Uber** [*Research Software Engineering Intern*]   *Summer 22', Summer 23'*
  - Using *LLMs* for automated code fixes using code reviews
  - *Static analysis* tool to detect potential nil panics in Go

- **Microsoft Research** [*Research Software Engineer*]   *Oct 2019 - Jul 2020*
  - Worked on SeeDot *compiler* for fixed-point compilation of ML models

- **Uber** [*Software Engineer*]   *July 2018 - Oct 2019*
  - Worked on NullAway *static program analysis* tool to statically find JAVA NPEs
  - Worked on Uber Lite and Uber bus applications

- **Max Plank Institute of Software Systems, Germany** [*Research Fellow*]   *Summer 18'*
  - *Machine learning* techniques for invariant synthesis

- **Seoul National University** [*Research Intern*]   *Summer 17'*
  - Succinct data structures to solve query processing problems

Publications

- **RefineStat: Efficient Exploration for Probabilistic Program Synthesis**
  Madhav kanda, Shubham Ugare, Sasa Misailovic
  Preprint. Under Review

- **ARQ: A Mixed-Precision Quantization Framework for Accurate and Certifiably Robust DNNs**
  Yuchen Yang, Shubham Ugare, Yifan Zhao, Gagandeep Singh, Sasa Misailovic.
  Preprint. Under Review

- **DINGO: Constrained Inference for Diffusion LLMs**
  Tarun Suresh, Debangshu Banerjee, Shubham Ugare, Sasa Misailovic, Gagandeep Singh
  NeurIPS 2025 (Neural Information Processing Systems)

- **Byte-level Tokenizers Unavoidably Enable LLMs to Generate Ill-formed UTF-8**
  Preston Firestone, <u>Shubham Ugare</u>, Gagandeep Singh, Sasa Misailovic
  COLM 2025 (Conference on Language Modeling)

- **CRANE: Reasoning with constrained LLM generation**
  Debangshu Banerjee, Tarun Suresh, <u>Shubham Ugare</u>, Sasa Misailovic, Gagandeep Singh
  ICML 2025 (International Conference on Machine Learning)

- **IterGen: Iterative Semantic-aware Structured LLM Generation with Backtracking**
  <u>Shubham Ugare</u>, Rohan Gumaste, Tarun Suresh, Gagandeep Singh, Sasa Misailovic.
  ICLR 2025 (International Conference on Learning Representations)

- **SynCode: LLM Generation with Grammar Augmentation**
  <u>Shubham Ugare</u>, Tarun Suresh, Hangoo Kang, Sasa Misailovic, Gagandeep Singh
  TMLR 2025 (Transactions on Machine Learning Research)

- **Incremental Randomized Smoothing Certification**
  <u>Shubham Ugare</u>, Tarun Suresh, Debangshu Banerjee, Gagandeep Singh, Sasa Misailovic
  ICLR 2024 (International Conference on Learning Representations)

- **On the Robustness of Watermarking LLM Generated Code**
  Tarun Suresh, <u>Shubham Ugare</u>, Gagandeep Singh, Sasa Misailovic
  Tiny papers ICLR 2024 (Oral)

- **Incremental Verification of Neural Networks**
  <u>Shubham Ugare</u>, Debangshu Banerjee, Sasa Misailovic, Gagandeep Singh
  PLDI 2023 (Programming Language Design and Implementation)

- **Toward Continuous Verification of DNNs**
  <u>Shubham Ugare</u>, Debangshu Banerjee, Tarun Suresh, Sasa Misailovic, Gagandeep Singh
  Workshop @ ICML 2023

- **TeAAL: A Declarative Modeling Framework for Sparse Tensor Accelerators**
  Nandeeka Nayak, Toluwanimi Odemuyiwa, <u>Shubham Ugare</u>, Christopher Fletcher, Michael Pellauer, Joel Emer
  MICRO 2023 (IEEE/ACM International Symposium on Microarchitecture), **Micro Top Picks 2023 Honorable Mention**

- **A General Construction for Abstract Interpretation of Higher-Order Automatic Differentiation**
  Jacob Laurel, Rem Yang, <u>Shubham Ugare</u>, Robert Nagel, Gagandeep Singh, Sasa Misailovic
  OOPSLA 2022 (Object-Oriented Programming, Systems, Languages, and Applications)

- **Proof Transfer for Fast Certification of Multiple Approximate Neural Networks**
  <u>Shubham Ugare</u>, Gagandeep Singh, Sasa Misailovic
  OOPSLA 2022 (Object-Oriented Programming, Systems, Languages, and Applications)

- **Statheros: A Compiler for Efficient Low-Precision Probabilistic Programming**
  Jacob Laurel, Rem Yang, Atharva Sehgal, <u>Shubham Ugare</u>, Sasa Misailovic
  DAC 2021 (Design Automation Conference)

- **Secure Medical Image Analysis with CrypTFlow***
  Javier Alvarez-Valle, Pratik Bhatu, Nishanth Chandran, Divya Gupta, Aditya Nori, Aseem Rastogi, Mayank Rathee, Rahul Sharma, <u>Shubham Ugare</u>
  Workshop @ NeurIPS 2020

- **Approximate Query Processing over Static Sets and Sliding Windows**[*]
  Ran Ben Basat, Seungbum Jo, Srinivasa Rao Satti, <u>Shubham Ugare</u>
  ISAAC 2018 (International Symposium on Algorithms and Computation) and **TCS 2021**
  (Theoretical Computer Science)

  (* marked author names are alphabetically sorted)

Teaching

Teaching Assistant, CS421 Programming Languages & Compilers, UIUC Fall 2020

Teaching Assistant, CS521 Advanced Topics in Programming Systems, UIUC Spring 2024

Academic Service

Organizer: Neural Network Verification workshop @ ICML 2023, UIUC compiler seminar

Journal Reviewer: TMLR (Transactions on Machine Learning Research), JMLR (Journal of Machine Learning Research)

Conference Reviewer: CAV 2024 (Computer Aided Verification) - artifact, ICLR 2025 (International Conference on Learning Representations), ICML 2024, 2025 (International Conference on Machine Learning), NeurIPS 2025 (Conference on Neural Information Processing Systems), COLM 2025 (Conference on Language Modeling)

Mentoring

Mentored undergraduates and master's students at UIUC and coauthored several papers with them.

Rohan Gumaste (UIUC BS → MIT PhD)

Hangoo Kang (UIUC BS → Stanford MS)

Yuchen Yang (UIUC BS → UIUC PhD)

Tarun Suresh (UIUC BS)

Preston Firestone (UIUC MS)